Worksheet 2 Packet switching and routers

Task 1

Using the tool www.monitis.com/traceroute you need to investigate how long packets of data take to travel around the Internet.

Simply type in the address of the website you are trying to reach and record the average latency from Europe. You can also see a visualisation of the hops across routers from start to finish.

Continent	URL	Average response time
Europe	www.bbc.co.uk	
Europe		
Africa	www.southafrica.net	
Africa		
Asia	www.tianya.cn	
Asia		
Australasia	www.smh.com.au	
Australasia		
North America	google.com	
North America		
South America	www.brazil.org.za	
South America		

1. Which website has the shortest latency?

2. Which has the longest latency?

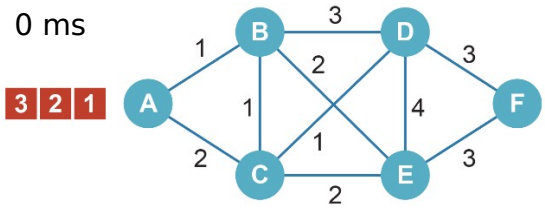
3. Why do you think this website has the longest latency?

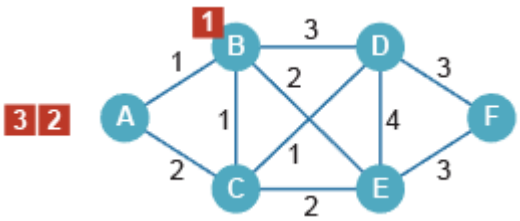
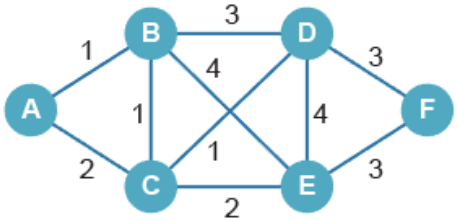
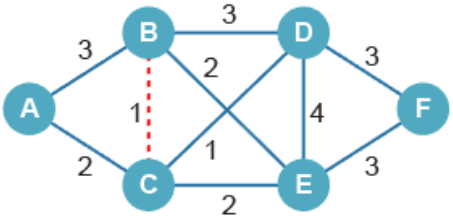
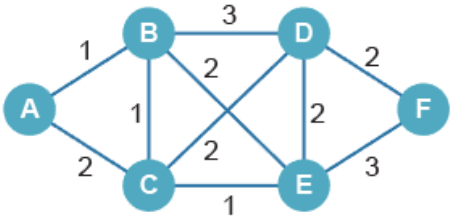
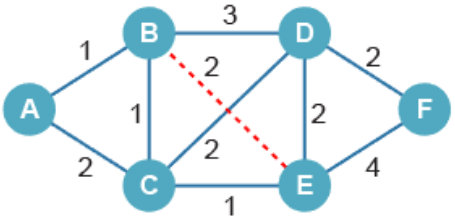
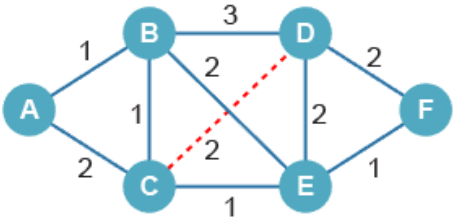
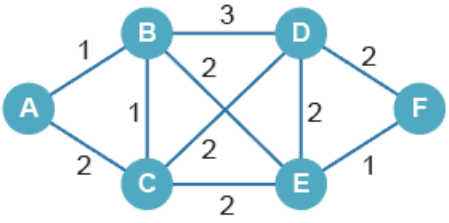
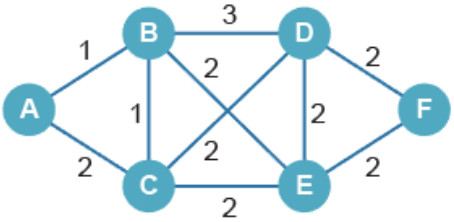
Task 2

The following network shows the latency in milliseconds (ms) between routers in a network. Routers estimate the latencies from the actual progress of packets during the previous ms.

Node A is sending data to node F as three packets in the order: 1, 2 and 3, setting off at 1 ms intervals.
On the diagrams below, label where these packets will be after each millisecond if each travels by one of the quickest routes calculated from the estimated latencies. Latencies (given by numbers marked between each node) and available routes vary each millisecond depending on congestion or cable failure (indicated by dotted red line).
At the start, (0 ms elapsed time) packets 1, 2 and 3 are shown in red at A.

0 ms



1 ms 	2 ms 
3 ms 	4 ms 
5 ms 	6 ms 
7 ms 	8 ms 

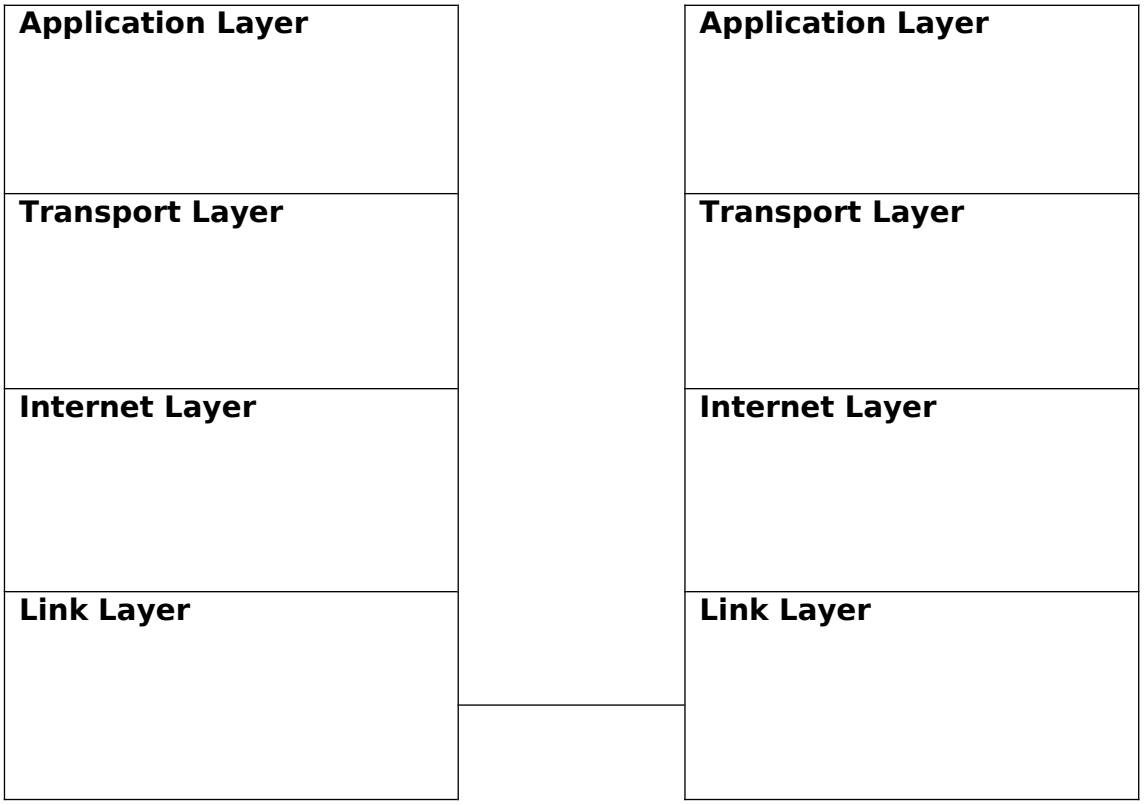
In which order will the packets arrive:

Justify why packet payloads are usually kept to around 1500 bytes. Consider the effects of much larger payloads on transmission time, and the effects of very small payloads on the overheads within the headers and trailers.

Task 3

A file is being transmitted across an Ethernet network using File Transfer Protocol (FTP)
and TCP/IP.

Label the diagram to explain what is happening at each stage of the communication process and add arrows to show the direction of travel.



Explain why TCP and IP are able to work with different application protocols and different network media, (for example HTTP web pages transferred via a fibre optic connection.)

Task 4

Email can be accessed on a server using two different protocols, POP3 and IMAP. Compare the differences between these.

What role does SMTP play in the delivery of email?